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## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, it is a problem how ROI is set up with a digital camera etc. For example, although it is easy to set up ROI using a viewer, probably, it will be very troublesome for a photography person to set up ROI at every photography.

[0005] The digital camera which can take a photograph on a viewer on the other hand, making a photographic subject image indicate a photography guidance frame, the template image, etc. by superposition also exists. For example, a photography person can perform framing desirable as a portrait simple by indicating by superposition at a photographic subject by using as a photography guidance frame the profile which was suitable at a person's bust shot in portrait photography. Moreover, a photography person can take a photograph by taking a photograph, indicating the template image by superposition at a photographic subject, looking at the superposition result of a template image. In addition, the mode which takes a photograph while indicating "guidance photography mode" and the template image for the mode which takes a photograph while displaying a guidance frame by superposition will be called "template image composition photography mode."

[0006] If ROI can be set up using the setting information on such a guidance frame or a template image, a photography person can save the time and effort which sets up ROI.

[0007] This invention aims at offering the image processing system which it is and can set an attention field as the image to photo easily and its approach for solving an above-mentioned problem.

[0008] Moreover, it sets it as other purposes to offer the image processing system which performs an image processing according to the attention field set as the image, and its approach.

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## DRAWINGS

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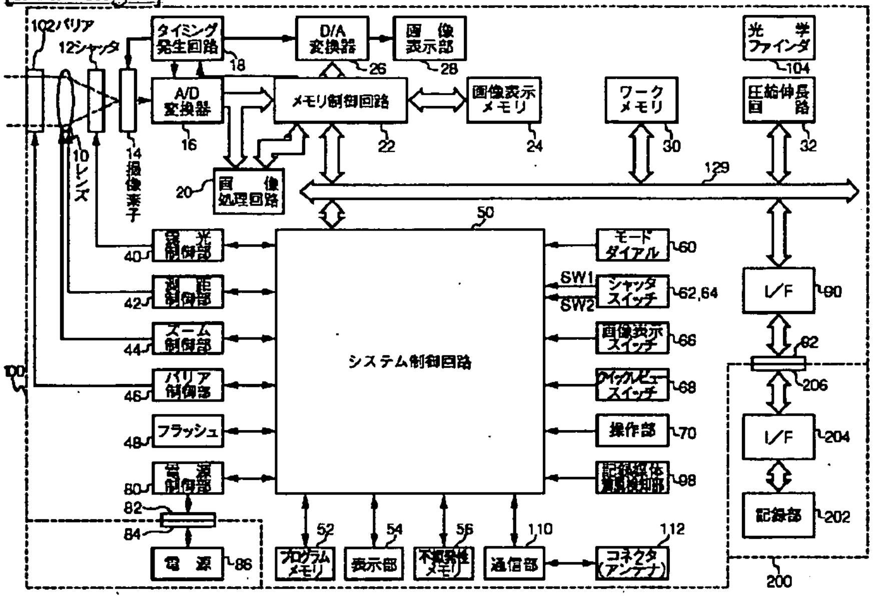
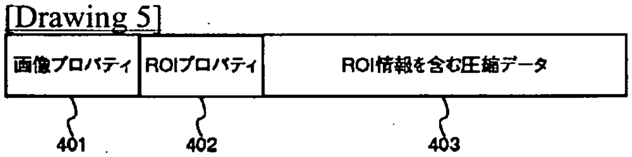
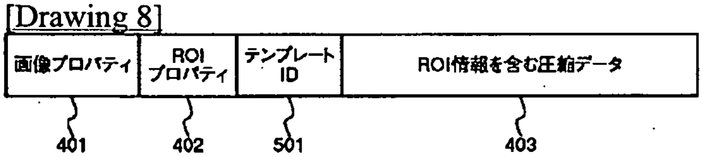
[Drawing 1]


102 バリア
12 シャッタ
10 レンズ
14 撮像素子
タイミング発生回路
18
A/D変換器
16
D/A変換器
26
画像表示部
28
メモリ制御回路
22
画像表示メモリ
24
ワークメモリ
30
光学ファインダ
104
圧縮伸長回路
32
129
20 画像処理回路
50
システム制御回路
40 露光制御部
42 測距制御部
44 ズーム制御部
46 バリア制御部
48 フラッシュ
80 電源制御部
82
84
電源 86
100
モードダイアル 60
SW1
SW2
シャッタスイッチ 62,64
画像表示スイッチ 66
クイックレビュースイッチ 68
操作部 70
記録媒体着脱検知部 98
52 プログラムメモリ
54 表示部
56 不揮発性メモリ
110 通信部
112 コネクタ(アンテナ)
I/F 90
92
206
I/F 204
記録部 202
200

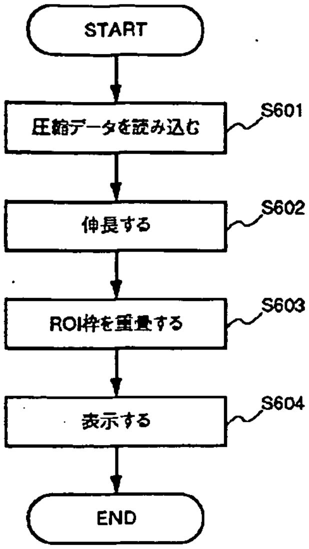
[Drawing 5]


画像プロパティ
ROIプロパティ
ROI情報を含む圧縮データ
401
402
403

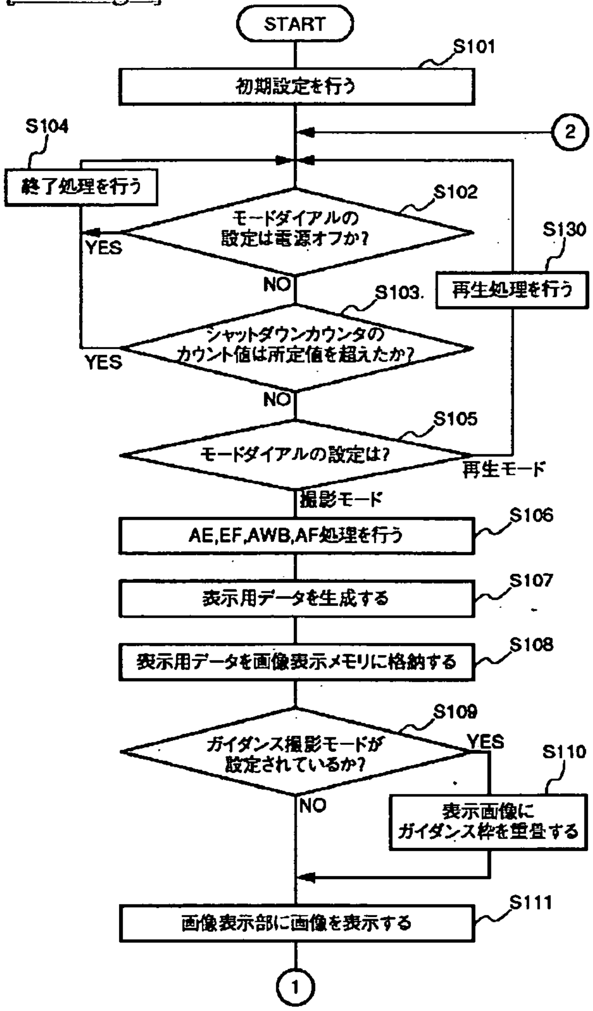
[Drawing 8]


画像プロパティ
ROIプロパティ
テンプレートID
ROI情報を含む圧縮データ
401
402
501
403

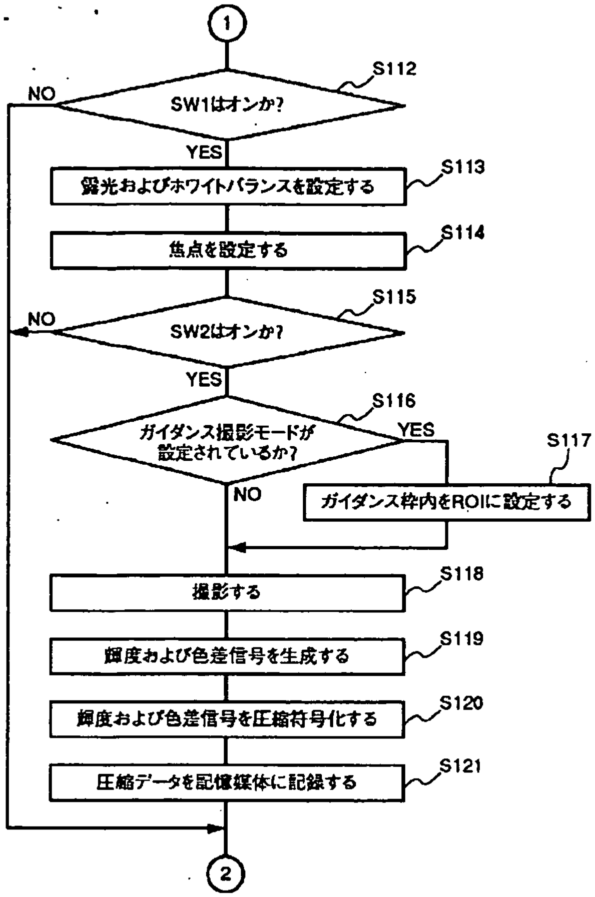
[Drawing 9]


START
圧縮データを読み込む
S601
伸長する
S602
ROI枠を重畳する
S603
表示する
S604
END

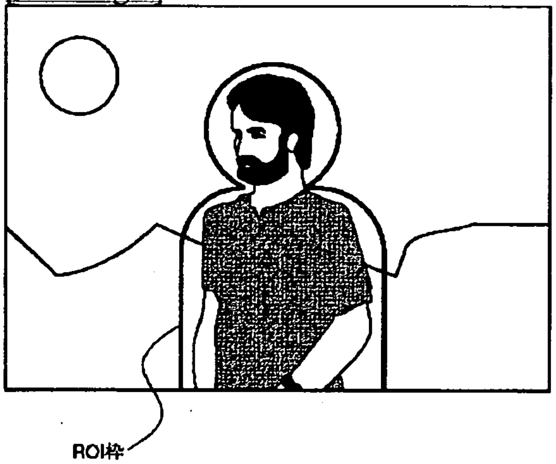
[Drawing 2]


START
初期設定を行う
S101
2
S104
終了処理を行う
モードダイアルの
設定は電源オフか?
S102
YES
NO
S130
再生処理を行う
S103.
シャットダウンカウンタの
カウント値は所定値を超えたか?
YES
NO
S105
モードダイアルの設定は?
再生モード
撮影モード
AE,EF,AWB,AF処理を行う
S106
表示用データを生成する
S107
表示用データを画像表示メモリに格納する
S108
S109
ガイダンス撮影モードが
設定されているか?
YES
S110
NO
表示画像に
ガイダンス枠を重畳する
画像表示部に画像を表示する
S111
1

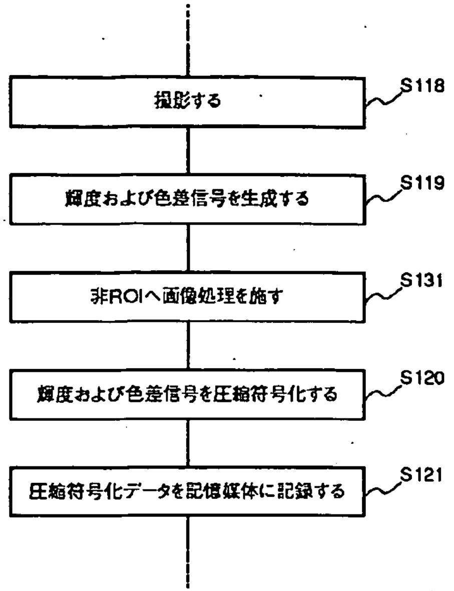
[Drawing 3]


1
S112
NO
SW1はオンか?
YES
S113
露光およびホワイトバランスを設定する
S114
焦点を設定する
S115
NO
SW2はオンか?
YES
S116
ガイダンス撮影モードが設定されているか?
YES
NO
S117
ガイダンス枠内をROIに設定する
S118
撮影する
S119
輝度および色差信号を生成する
S120
輝度および色差信号を圧縮符号化する
S121
圧縮データを記憶媒体に記録する
2

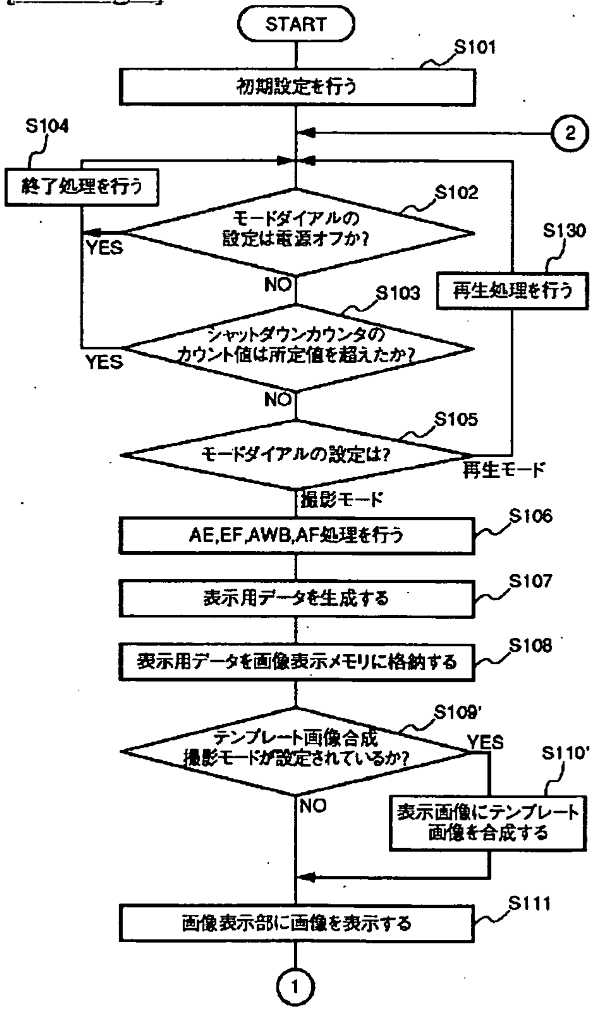
[Drawing 4]



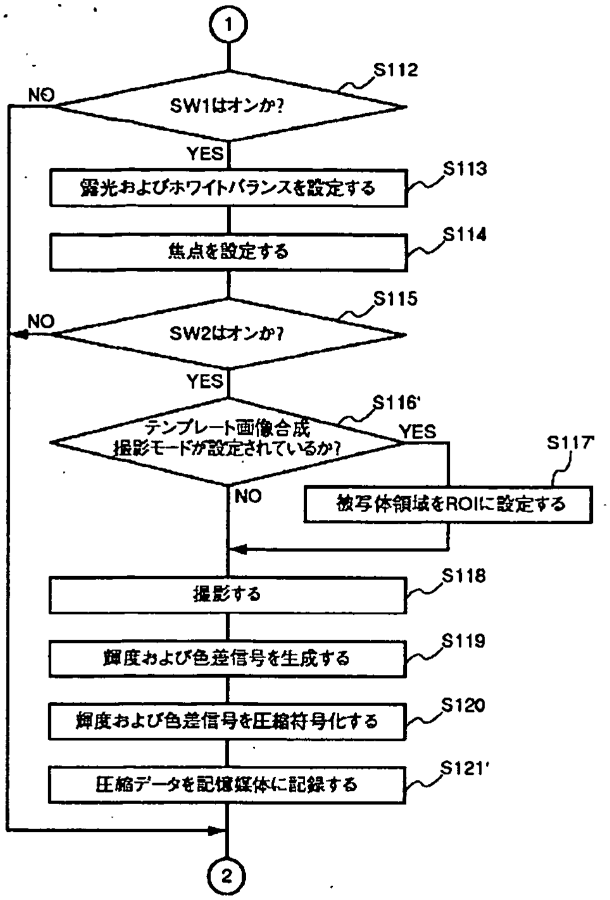
[Drawing 10]


撮影する
S118
輝度および色差信号を生成する
S119
非ROIへ画像処理を施す
S131
輝度および色差信号を圧縮符号化する
S120
圧縮符号化データを記憶媒体に記録する
S121

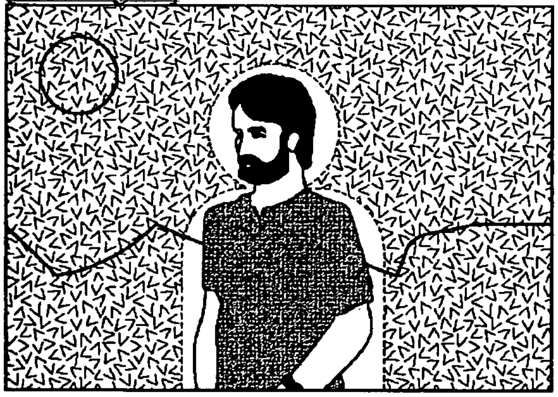
[Drawing 6]


START
S101
初期設定を行う
②
S104
終了処理を行う
S102
モードダイアルの設定は電源オフか?
YES
NO
S130
再生処理を行う
S103
シャットダウンカウンタのカウント値は所定値を超えたか?
YES
NO
S105
モードダイアルの設定は?
再生モード
撮影モード
S106
AE,EF,AWB,AF処理を行う
S107
表示用データを生成する
S108
表示用データを画像表示メモリに格納する
S109'
テンプレート画像合成撮影モードが設定されているか?
YES
NO
S110'
表示画像にテンプレート画像を合成する
S111
画像表示部に画像を表示する
①

[Drawing 7]


①
S112
NO
SW1はオンか?
YES
S113
露光およびホワイトバランスを設定する
S114
焦点を設定する
S115
NO
SW2はオンか?
YES
S116'
テンプレート画像合成
撮影モードが設定されているか?
YES
S117'
NO
被写体領域をROIに設定する
S118
撮影する
S119
輝度および色差信号を生成する
S120
輝度および色差信号を圧縮符号化する
S121'
圧縮データを記憶媒体に記録する
②

[Drawing 11]



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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the image processing system for reproducing, in order to photo and record an image, concerning an image processing system and its approach, and its approach.
[0002]
[Description of the Prior Art] In the digital camera etc., the picture compression of a JPEG base-line method is used abundantly. A JPEG base-line method uses the quantization table of homogeneity for the whole image. Therefore, since a certain field in an image is uncompressible into high definition from others, other parts will be compressed into high definition, if a certain field is compressed into high definition and it excels. Consequently, the size of the image file after compression becomes large, and a transfer and record of an image file will take time amount.
[0003] So-called JPEG2000 is examined as a next-generation compression method. Although the detailed explanation about JPEG2000 is omitted, a certain attention range in an image (region of interest: ROI) is specified, and the image of ROI has the characteristic function compressed with a different compression coefficient (compressibility) from other fields. While this function solves the above-mentioned problem, it is law.
[0004]
[Problem(s) to be Solved by the Invention] However, it is a problem how ROI is set up with a digital camera etc. For example, although it is easy to set up ROI using a viewer, probably, it will be very troublesome for a photography person to set up ROI at every photography.
[0005] The digital camera which can take a photograph on a viewer on the other hand, making a photographic subject image indicate a photography guidance frame, the template image, etc. by superposition also exists. For example, a photography person can perform framing desirable as a portrait simple by indicating by superposition at a photographic subject by using as a photography guidance frame the profile which was suitable at a person's bust shot in portrait photography. Moreover, a photography person can take a photograph by taking a photograph, indicating the template image by superposition at a photographic subject, looking at the superposition result of a template image. In addition, the mode which takes a photograph while indicating "guidance photography mode" and the template image for the mode which takes a photograph while displaying a guidance frame by superposition will be called "template image composition photography mode."
[0006] If ROI can be set up using the setting information on such a guidance frame or a template image, a photography person can save the time and effort which sets up ROI.
[0007] This invention aims at offering the image processing system which it is and can set an attention field as the image to photo easily and its approach for solving an above-mentioned problem.
[0008] Moreover, it sets it as other purposes to offer the image processing system which performs an image processing according to the attention field set as the image, and its approach.
[0009]
[Means for Solving the Problem] This invention is equipped with the following configurations as a way stage which attains the aforementioned purpose.
[0010] An image pick-up means by which the image processing system concerning this invention photos an image, a display means to display the image of a photographic subject, It is the image processing system which has the control means which controls the processing means and them which process the photoed image. Said control means Said display means is made to display in piles the frame which guides photography on the image of a photographic subject, and it is characterized by making said field of the image photoed at said processing means within the limit process on different conditions from said field outside the limit.

[0011] Moreover, an image pick-up means to photo an image, a display means to display the image of a photographic subject, It is the image processing system which has the control means which controls the processing means and them which process the photoed image. Said control means The image of a photographic subject is made to display a template image on said display means in piles, and it is characterized by making fields other than said template image field of the image photoed by said processing means process on different conditions from said template image field.

[0012] Moreover, a reading means to read the data file stored in memory, a playback means to reproduce an image from the read data fail, It is the image processing system which has the control means which controls the display means and them which display an image. Said control means When the information which shows the attention field of an image is included in said data file, it is characterized by displaying on said display means the image which shows said attention field repeatedly to a playback image, or performing a predetermined image processing alternatively outside the attention field or a field.

[0013] The image-processing approach concerning this invention makes a display means to display the image of a photographic subject display in piles the frame which guides photography on the image of a photographic subject, and is characterized by processing said field of the image photoed by the image pick-up means within the limit on different conditions from said field outside the limit.

[0014] Moreover, the image of a photographic subject is made to display a template image on a display means to display the image of a photographic subject, in piles, and it is characterized by processing the field outside said template image field of the image photoed by the image pick-up means on different conditions from said template image field.

[0015] Moreover, it is characterized by reading the data file stored in memory, reproducing an image from the read data file, and displaying the image which shows said attention field repeatedly to a playback image when the information which shows the attention field of an image to said data file is included, or performing a predetermined image processing alternatively outside the attention field or a field.

[0016]

[Embodiment of the Invention] Hereafter, the image processing system of 1 operation gestalt concerning this invention is explained to a detail with reference to a drawing.

[0017]

[The 1st operation gestalt] Hereafter, the example which sets up ROI automatically in guidance photography mode is explained as the 1st operation gestalt.

[0018] [Configuration of electronic camera] drawing 1 is the block diagram showing the example of a configuration of the electronic camera 100 of the 1st operation gestalt.

[0019] In drawing 1, the shutter which a taking lens and 12 extract 10 and is equipped with a function, the image sensor from which 14 changes an optical image into an electrical signal, and 16 are analog digital (A/D) converters which change the analog signal output of an image sensor 14 into a digital signal.

[0020] 18 is the timing generating circuit which supplies a clock signal and a control signal to an image sensor 14, A/D converter 16, and D/A converter 26, and is controlled by the memory control circuit 22 and the system control circuit 50.

[0021] 20 is an image-processing circuit and performs predetermined pixel interpolation processing and predetermined color transform processing to the data sent from the data outputted from A/D converter 16, or the memory control circuit 22. Moreover, the image-processing circuit 20 performs predetermined data processing to the data of the image picturized. The obtained result of an operation is used, in order that the system control circuit 50 may control the exposure control section 40 and the ranging control section 42 and may perform automatic focus (AF) processing of a TTL (Through The Lens) method, automatic exposure (AE) processing, and FURASSHUPURI luminescence (EF) processing. Furthermore, the image-processing circuit 20 performs predetermined data processing to the data of the image picturized, and also performs automatic white balance (AWB) processing of a TTL method based on the result of an operation obtained.

[0022] 22 is a memory control circuit and controls A/D converter 16, the timing generating circuit 18, the image-processing circuit 20, the image display memory 24, D/A converter 26, the work-piece memory 30, and a compression expansion circuit 32. The data outputted from A/D converter 16 are written in the image display memory 24 or the work-piece memory 30 via the direct memory control circuit 22 through the image-processing circuit 20.

[0023] It is the image display section which image display memory becomes in 24 and a D/A converter and 28 become from TFT LCD etc. in 26. The image data for a display written in the image display memory 24 is sent to the image display section 28 through D/A converter 26, and an image is displayed. Therefore, if the image data picturized is serially sent to the image display section 28, electronic finder ability will be realized. Moreover, with directions of the system control circuit 50, the display of the image display section 28 can be turned on/turned off in arbitration, and where it turned OFF the display and a back light is erased, it can reduce the power consumption of an electronic camera 100 sharply.

[0024] 30 is the work-piece memory which consists of a semi-conductor RAM for storing the static image and dynamic image which were photoed etc., and is equipped with sufficient storage capacity to store the static image of predetermined number of sheets, and the dynamic image of predetermined time. Even when this performs the burst photography and the panoramic exposure which photo the static image of two or more sheets continuously, high-speed photography is attained by writing a lot of image data in the work-piece work-piece memory 30 at a high speed. Moreover, the work-piece work-piece memory 30 can be used also as a working area of the system control circuit 50.

[0025] 32 is the compression expansion circuit which carries out compression expanding of the image data by the picture compression approach of using discrete wavelet transform (DWT) etc., and writes again the image data which read the image data stored in the work-piece memory 30, compressed or developed, and was compressed or elongated in the work-piece memory 30.

[0026] 40 is the exposure control section which controls the shutter 12 which extracts and is equipped with a function, and also has a flash plate modulated light function by cooperating with a flash plate 48. 48 is a flash plate and has the floodlighting function and flash plate modulated light function of AF fill-in flash. The ranging control section by which 42 controls focusing of a taking lens 10, the zoom control section by which 44 controls zooming of a taking lens 10, and 46 are barrier control sections which control actuation of the barrier 102 which protects a lens 10.

[0027] As mentioned above, the exposure control section 40 and the ranging control section 42 are controlled by the TTL method. That is, based on the result of an operation which calculated the data of the image picturized by the image-processing circuit 20, the system control circuit 50 controls the exposure control section 40 and the ranging control section 42.

[0028] The system control circuit where 50 controls the electronic camera 100 whole, and 52 are program memory which memorizes a constant, a variable, a program, etc. for actuation of the system control circuit 50.

[0029] 54 is a display which displays the operating state, the established state, and various kinds of messages of an electronic camera 100 using an alphabetic character, a notation, an image, etc. according to the program execution by the system control circuit 50. A display 54 is a simple substance in the cone location only near the control unit of an electronic camera 100, or is divided and arranged at plurality. Usually, although a display 54 consists of LCD, LED, an indicator of a lamp, etc., a beep sound, a voice-told message, etc. can also be further uttered combining a pronunciation component. moreover, a part of display 54 -- a function overlaps in the optical finder 104 and is arranged.

[0030] To the information displayed on LCD of a display 54 etc. For example, a setup of single shot/continuous shooting, a setup of a self-timer, Compressibility, the number of record pixels, record number of sheets, ****** possible number of sheets, shutter speed, A setup of a drawing value and exposure amendment, a setup of a flash plate, a setup of bloodshot-eyes relaxation, a setup of macro photography, There are a setup of a buzzer, the cell residue for clocks, a cell residue, an error situation, the information in two or more digits, the attachment-and-detachment condition of a record medium 200, actuation of a communication interface (I/F), a date, time of day, a connection condition with an external computer, etc.

[0031] Moreover, for example, a focus condition, a photography preparation completion, hand deflection warning, a flash plate charge condition, the completion of flash plate charge, shutter speed, a diaphragm value, the condition of exposure amendment, write-in actuation of a record medium, etc. are one of those which are displayed in the optical finder 104 among the display information on a display 54.

[0032] Furthermore, there are for example, a focus condition, a photography preparation completion, hand deflection warning, a flash plate charge condition, the completion of flash plate charge, write-in actuation of a record medium, a notice of a macro photography setting, a rechargeable battery charge condition, etc. in the information displayed on indicators, such as LED of a display 54.

[0033] And the information displayed on indicators, such as a lamp of a display 54, has for example, the notice of a self-timer etc. The lamp for this notice of a self-timer can also be shared in the source of AF fill-in flash.

[0034] 56 is the nonvolatile memory in which elimination and record are possible electrically, for example, EEPROM etc. is used.

[0035] 60, 62, 64, 66, 68, and 70 are the input means for inputting various kinds of directions, to the system control circuit 50, they are single, or combine two or more input means, such as a switch, a dial, a touch panel, pointing by look detection, and speech recognition, and are constituted in it.

[0036] The mode dial 60 is a dial for changing and setting up function modes, such as power-source OFF, automatic photography mode, program photography mode, shutter speed priority photography mode, diaphragm priority photography mode, manual photography mode, depth of focus priority (depth) photography mode, portrait photography mode, scenery photography mode, close-up-photography photography mode, sport photography mode, night view photography mode, panoramic exposure mode, a playback mode, multi-screen playback and washout mode, and PC connection mode.

[0037] The shutter switch 62 will be turned on if a shutter carbon button is pushed to the middle. If the shutter switch 62 is turned on, AF processing, air entrainment, AWB processing, EF processing, etc. will be started.

[0038] The shutter switch 64 will be turned on if a shutter carbon button is pushed to the last. If the shutter switch 64 is turned on, it will be read from an image sensor 12. A/D-converter 16 The exposure processing which writes the image data carried out in the work-piece memory 30 through the memory control circuit 22, The development which performs data processing to the image data read from the work-piece memory 30 by the memory control circuit 22 in the image-processing circuit 20, A series of processings of the record processing which compresses the image data similarly read from the work-piece memory 30 in a compression expansion circuit 32, and writes the compressed data in a record medium 200 are started.

[0039] The image display switch 66 turns on and off the display of the image display section 28. In case a photograph is taken using the optical finder 104, with this switch 66, the electric power supply to the image display section 28 (LCD and back light) can be intercepted, and power saving can be planned.

[0040] The quick review switch 68 turns on and off the quick review function which carries out automatic playback of the image photoed immediately before. In addition, especially the electronic camera 100 of this operation gestalt is equipped with the function to set up a quick review function when the image display switch 66 is set up off.

[0041] In the control unit 70 which consists of a carbon button, a touch panel, etc. A menu button, a set carbon button, a macro carbon button, a multi-screen playback form feed carbon button, A flash plate setup key, a single copy / continuous shooting / self-timer change carbon button, a menu migration + (plus) carbon button, A menu migration-(minus) carbon button, a playback image migration + (plus) carbon button, A playback image migration-(minus) carbon button, a photography image quality selection carbon button, an exposure amendment carbon button, There are a date / time amount setup key, the image display ON / off carbon button that sets up ON/OFF of the image display section 28, quick review-on / off carbon button etc. which sets up the quick review function to make automatic playback carry out immediately after photoing the photoed image at the image display section 28.

[0042] 80 is the power control section, it is constituted by a cell detector, a DC-DC converter, the switching circuit that changes the block which should be energized, performs detection of the existence of wearing of a cell, the class of cell, and a cell residue, controls a DC-DC converter based on directions of a detection result and the system control circuit 50, and supplies required power to each part containing a required period and a record medium. 86 is the power source which consists of rechargeable batteries, such as primary cells, such as an alkaline cell and a lithium cell, a NiCd cell, a NiMH cell, and a Li-ion cell, or a power adapter, and is connected to the power control section 80 free [ attachment and detachment ] through connectors 82 and 84.

[0043] 90 is an interface (I/F) which connects record media which mind and are connected free [ attachment and detachment ], such as a memory card and a hard disk, and the system bus 129 of an electronic camera 100 connector 92. 98 is the record-medium attachment-and-detachment detection section which detects whether the connector 92 is equipped with the record medium. That the connector 92 is equipped with the communication link card later mentioned instead of a record medium can also detect the record-medium attachment-and-detachment detection section 98.

[0044] Although explained as a thing with one the interface and connector for connecting a record medium, the number of an interface and connectors two, or this operation gestalt is available for them, even if there are three or more lines. Moreover, two interfaces and a connector may be made into specification different, respectively that what is necessary is just to use the thing based on the specification of a PCMCIA (Personal Computer Memory Card International Association) card, CF (CompactFlash) card, etc. for an interface and a connector.

[0045] If an interface and a connector are made based on the specification of a PCMCIA card, CF card, etc., it becomes possible to connect various communication link cards, such as a LAN card, a MODEM card, a USB (Universal Serial Bus) card, an IEEE1394 card, an IEEE 1284 card, a SCSI (Small Computer System Interface) card, and a PHS communication link card, and the management information which was attached to image data or image data among peripheral devices, such as other computers and a printer, can be communicated.

[0046] 200 is record media, such as a memory card and a hard disk. The record medium is equipped with the interface 204 and connector 206 for connecting with the Records Department 202 and the electronic camera 100 which consist of semiconductor memory, a magnetic disk, etc.

[0047] 102 is covering mechanically the image pick-up section containing a lens 10, and is barrier which protects the image pick-up section and prevents adhesion and breakage of dirt.

[0048] 104 is an optical finder, and a user can observe photographic coverage optically, without using the electronic finder ability by the image display section 28. moreover, it mentioned above -- as -- the inside of the optical finder 104 -- a part of display 54 -- the function is arranged.

[0049] 110 is the communications department and has various communication facility, such as parallel communication facility, such as serial communication functions, such as RS232C, USB, and/or IEEE1394, IEEE 1284, and/or SCSI, other MODEM(s), LAN, radio, and an infrared (Ir) communication link.

[0050] 112 is a connector which is connected to the communications department 110 and connects an electronic camera 100 with other devices. Of course, when performing radio and an antenna performs infrared ray communication, a part of light sending and receiving corresponds.

[0051] [Actuation of electronic camera] drawing 2 and drawing 3 are the flow charts which show an example of the main routine of an electronic camera 100, and show the processing which the system control circuit 50 starts by a changing battery etc.

[0052] First, at step S101, while a flag, a control variable, etc. are initialized, each part of an electronic camera is initialized. Next, if the setting location of the mode dial 60 is judged and it is set as power-source OFF at step S102, it will shift to step S104. Moreover, if the mode dial 60 was set up in addition to power-source OFF, it will progress to step S103.

[0053] At step S103, when not operated [ predetermined time ], the counted value of the auto shutdown timer (un-illustrating) for intercepting a power source automatically is investigated, and when counted value is over the predetermined value, it shifts to step S104.

[0054] At step S104, the post process for turning off a power source is performed. That is, the display of a display 54 is changed into exit status, the barrier 102 is closed, the image pick-up section is protected, setting mode is recorded on nonvolatile memory 56, and the predetermined post process of intercepting a power source with unnecessary each part which contains the image display section 28 by the power control section 80 is performed in the required parameter and the required set point containing a flag, a control variable, etc., and a list. Then, it stands by until return and the mode dial 60 are set to step S102 in addition to power-source OFF.

[0055] If the counted value of an auto shutdown timer is not over the predetermined value, and the setting location of the mode dial 60 is judged again and it is set as the playback mode at step S105, regeneration will be performed at step S130 and it will return to step S102 after processing. Although regeneration reads data from a storage 200, elongates the compressed data and displays an image on the image display section 28, it omits detailed explanation here.

[0056] Moreover, when the mode dial 60 is set as photography mode, it shifts to step S106, and a automatic exposure (AE), FURASSHUPURI luminescence (EF), an automatic white balance (AWB), automatic focus (AF) processing, etc. are performed.

[0057] Processing of step S106 is explained concretely. First, image data is serially read into the image-processing circuit 20 through an image sensor 14 and A/D converter 16 by control of the system control circuit 50. And the image-processing circuit 20 performs the operation for the air entrainment of a TTL method, EF processing, AWB processing, and AF processing using the image data read serially. in addition, these processings are performed by carrying out required-number end appearance of the required field among the whole photography field. Thereby, in each processing, the optimal operation is attained for every different modes, such as central important mode, an average mode, and evaluation mode.

[0058] AE control using the exposure control section 40 carries out until it is judged based on the result of an operation of the image-processing circuit 20 that the system control circuit 50 has proper exposure. Furthermore, a flash plate judges whether it is the need using the measurement data obtained by AE control, and if a flash plate is required for the system control circuit 50, it will set a flash plate flag and will make a flash plate 48 charge. And when it is judged that exposure is proper, measurement data and/or an active parameter are stored in the internal memory or program memory 52 of the system control circuit 50.

[0059] Then, the system control circuit 50 performs AWB control which adjusts the parameter of color processing which the image-processing circuit 20 uses until it is judged that a white balance is proper based on the measurement data obtained by the result of an operation of the image-processing circuit 20, and AE control. And when it is judged that a white balance is proper, measurement data and/or an active parameter are stored in the internal memory or program memory 52 of the system control circuit 50.

[0060] Then, AF control using the ranging control section 42 is performed until the system control circuit 50 is judged to be a focus using the measurement data obtained by AE control and AWB control. and -- if judged as a focus -- measurement data and/or an active parameter -- the internal memory of the system control circuit 50 -- or it memorizes program memory 52 and ranging and photometry processing are completed.

[0061] Next, the image processing for making photography image data into the image data (data for a display) suitable for displaying on the image display section 28 by the image-processing circuit 20 at step S107 is performed. Color conversion, white balance adjustment, a brilliance control, etc. are processed to photography image data, and, specifically, the data for a display are generated. The data for a display are step S108, and are stored in the image display memory 24 by the memory control circuit 22.

[0062] Next, if it judges, and it is set up and does not put in whether guidance photography mode is set up at step S109, D/A conversion of the data for a display stored in the image display memory 24 is carried out, and it expresses in the image display section 28 as step S111. On the other hand, when guidance photography mode is set up, it is step S110 and guidance frame information is read from memory 30 etc. by the memory control circuit 22, it is step S111 and the image with which the image of the data for a display stored in the image display memory 24 was overlapped on the guidance frame is displayed on the image display section 28.

[0063] In addition, in this operation gestalt, as an example, when performing portrait photography, the guidance frame for portrait photography (ROI frame) as displayed a guidance frame and shown in drawing 4 shall be displayed on the image display section 28.

[0064] Next, it judges whether SW1 of the shutter switch 66 is turned on at step S112, and if SW1 is off, it will return to step S102. Moreover, if SW1 is ON, it will shift to step S113, and the optimal light exposure is determined from the photometry value at the time, and the exposure control section 40 is controlled. Then, at step S114, the amount of lens drives is determined from the ranging value at the time, and the ranging control section 42 is driven.

[0065] Next, it judges whether SW2 of the shutter switch 66 is turned on at step S115, and if SW2 is off, it will return to step S102. Moreover, if SW2 is ON, it will shift to step S116 and photography actuation will be started.

[0066] At step S116, it judges whether guidance photography mode is set up like step S109. When guidance photography mode is set up, after setting within the limit [ guidance ] as ROI at step S117, photography is performed at step S118. When the exposure time based on photometry data passes, it makes a shutter 12 closed, after the system control circuit 50 controls the exposure control section 40 according to the photometry data memorized by the internal memory or memory 30, and makes a diaphragm of a shutter 12 set up and makes a shutter 12 open. And a charge signal is read from an image sensor 14, and the image data photoed by memory 30 is made to write in through A/D converter 16, the image-processing circuit 20, and the memory control circuit 22, without minding the image-processing circuit 20.

[0067] At step S119, a luminance signal and a color-difference signal are generated by the image-processing circuit 20 from the photography image data stored in memory 30, and memory 30 memorizes again. Moreover, the system control circuit 50 makes image data read from memory 30, and makes the image data for a display transmit to the image display memory 24 through the memory control circuit 22.

[0068] Next, at step S120, the system control circuit 50 carries out compression coding of the luminance signal and chrominance signal which were stored in memory 30, and memorizes them in memory 30. However, when ROI is specified, compression coding in consideration of a part for the specification part is performed. Although what is necessary is just to use for compression coding in consideration of ROI various approaches by which proposal examination is carried out by JPEG2000 etc., it carries out as follows, for example.

[0069] First, ROI in an image is created as a bit plane image, and let this be an ROI mask. If a certain multiplier is a multiplier of the image part belonging to ROI in case the multiplier which DWT(ed) the image is encoded, the sign (ROIMASK sign) which shows that it belongs to ROI will be added to the multiplier. And compression coding is carried out, using an ROI part and a non-ROI part as another sequence (sign train). That is, from the decoder which elongates the data by which compression coding was carried out, it seems that there are an ROI image and a non-ROI image.

[0070] Moreover, the following approach may be used. Like the point, an ROI mask is generated, and if a certain multiplier is a multiplier of the image part belonging to ROI in case the multiplier which DWT(ed) the image is encoded, the predetermined level part shift up of the multiplier will be carried out. That is, in JPEG2000, priority is given to a high order bit plane at the time of coding, it encodes at it, and a low order bit plane is excluded according to a situation. Therefore, it will encode to a lower bit relatively and compression coding of the ROI part which is a part which carried out the shift up will be carried out by high image quality.

[0071] Of course, this operation gestalt may be related with assignment of ROI, may encode and decode ROI by approaches other than the above, and does not restrict coding and decode of ROI.

[0072] Memory 30 memorizes, the data by which compression coding was carried out as mentioned above are changed into the data file of a predetermined format, and through an interface 90 and a connector 92, it is step S121 and they are memorized [ they are transmitted to a record medium 200 and ]. Then, processing returns to step S102 in preparation for the next actuation.

[0073] Drawing 5 is drawing showing the example of a format of the compressed data in this operation gestalt. In drawing 5, 403 is the compressed image data. Header information 401 and 402 is recorded before the compressed image data 403. Various property information, such as a model name of the camera used for the size of an image in every direction and photography, is indicated by the image property 401. The ROI property 402 is recorded when compressed data 403 has ROI, and it is indicated what kind of semantics ROI of compressed data 403 has. The ROI property 402 is 1 byte of information, and has the following relation between each value and the semantics of ROI. Definition 0 of ROI: Main photographic subject field 1 specified as arbitration by the user: Field 2 of a guidance within the limit photoed in guidance photography mode: [0074] which is a photographic subject field when a photograph is taken in template composition photography mode and whose photographic subject fields are fields other than a template image An assumption of that photography as which ROI was specified by guidance photography mode was performed will store "1" in the ROI property 402. In addition, although it expresses in the format shown in drawing 5 so that ROI information may be included in compressed data 403, a format in which ROI information is included in a part not only for this but a header unit is sufficient.

[0075] Thus, since according to the 1st operation gestalt within the limit [ guidance ] is automatically set up as an ROI when a photograph is taken in guidance photography mode, the photography person who is the user of an electronic camera can save the time and effort which sets up ROI at every photography.

[0076]

[The 2nd operation gestalt] Hereafter, the image processing system of the 2nd operation gestalt concerning this invention is explained. In addition, in this operation gestalt, about the same configuration as the 1st operation gestalt and abbreviation, the same sign is attached and the detail explanation is omitted. The 2nd operation gestalt sets up ROI automatically in template composition photography mode.

[0077] Drawing 6 and drawing 7 are the flow charts which show an example of the main routine of the electronic camera 100 of the 2nd operation gestalt, and are the same as that of processing of the 1st operation gestalt shown in drawing 2 and drawing 3 almost. However, in the processing shown in drawing 6 and drawing 7, the processings corresponding to steps S109, S110, S116, S117, and S121 of drawing 2 and drawing 3 differ. S -- 109 -- ' -- S -- 110 -- ' -- S -- 116 -- ' -- S -- 117 -- ' -- and -- S -- 121 -- ' -- each -- a sign -- having given -- those -- processing -- the following -- explaining .

[0078] In step S109', if it judges, and it is set up and does not put [ template image composition photography mode or ] in whether it is set up or not, D/A conversion of the data for a display stored in the image display memory 24 is carried out, and it expresses in the image display section 28 as step S111. On the other hand, when template composition photography mode is set up, it is step S110' and template image data is read from memory 30 etc. by the memory control circuit 22, it is step S111 and the image with which the template image was compounded by the image of the data for a display stored in the image display memory 24 is displayed on the image display section 28.

[0079] In addition, a template image is a rectangle, and the image data shall have red (R), green (G), and three blue (B) planes, and shall have the value of each colors 0-255. The value of R= 0, G= 0, and B= 0 is set up as a value the invalid field (photographic subject field) of template image data indicates an invalid field to be. Therefore,,the processing which compounds a template image writes the image data in the image display memory 24 about pixels other than an invalid value.

[0080] Next, in step S116', it judges whether template image composition photography mode is set up like step S109'. When template image composition photography mode is set up, after setting a photographic subject field as ROI by step S117', photography is performed by step S118'.

[0081] Next, although the almost same processing as the 1st operation gestalt is performed in step S121', the format of image data by which compression coding was carried out comes to be shown in drawing 8, and header information 401, 402, and 501 is recorded in front of compressed data 403. A template ID 501 is ID for recognizing uniquely the template image used at the time of template composition photography. In addition, a value "2" is stored in the ROI property 402 as mentioned above.

[0082] Thus, since according to the 2nd operation gestalt a photographic subject field is automatically set up as an ROI when a photograph is taken in template image composition photography mode, the photography person who is the user of an electronic camera can save the time and effort which sets up ROI at every photography.

[0083]

[The 3rd operation gestalt] The example which classifies ROI by color as the 3rd operation gestalt according to the ROI property 402 performed at step S130 (regeneration) of the 1st and 2nd operation gestalt, and indicates by the marker is explained. Drawing 9 is the flow chart which shows this regeneration, and is processing performed by the system control section 50.

[0084] At step S601, the compression data file stored in the Records Department 202 in the format shown in drawing 5 or drawing 8 is read into memory 30. Of course, when the compression data file of the image which should be reproduced is already read into memory 30, step S601 is unnecessary.

[0085] Next, the image data which the compression expanding section 32 was made to elongate the compressed data stored in memory 30, and was elongated at step S602 is stored in the image display memory 24. When it is the compressed data with which ROI exists, the ROI information acquired at the time of expanding is written in memory 30. The following explanation assumes the case where there is ROI information. Moreover, when it is already elongated and the compressed data of the image which should be reproduced is stored in the image display memory 24, step S602 is unnecessary.

[0086] Next, at step S603, ROI information is read from memory 30 and the pixel value of the image display memory 24 equivalent to the frame location of ROI is overwritten according to the following regulations. That is, if an ROI property "0" Becomes (R, G, B), it will "1" Become about the pixel value of = (255, 0, 0) with reference to the value of the ROI property 402 (R, G, B) and it will "2" Become about the pixel value of = (0, 255, 0) (R, G, B), the pixel value of = (0 0,255) will be written in.

[0087] Next, at step S604, the image data stored in the image display memory 24 is changed into an analog signal with D/A converter 26, the image display section 28 is supplied, and regeneration is ended. The image with which the ROI frame as shown in drawing 4 was displayed is displayed on the image display section 28. If it becomes a field (** "1"), it is green, and the ROI frame displayed will be displayed in blue, if it becomes a photographic subject field (** "2") when [ which was specified as arbitration by the user / which is within the limit / guidance / which will be red if it becomes, and was photoed in guidance photography mode a main photographic subject field (an ROI property is "0") ] a photograph is taken in template composition photography mode.

[0088] Thus, since a classification-by-color indication of the ROI frame is given according to the property of ROI while an ROI frame is displayed at the time of playback of an image, a user can recognize ROI and its property at a glance.

[0089]

[The 4th operation gestalt] The example which performs an image processing to fields other than ROI as the 4th operation gestalt according to the ROI property 402 between step S119 (brightness and generation processing of a color-difference signal) of the 1st and 2nd operation gestalt and step S120 (compression coding processing) (step S131) is explained. Drawing 10 is the flow chart to which the image processing to non-ROI was added, and is processing performed by the system control section 50.

[0090] That is, make the image data and ROI information which were stored in memory 30 read into the image-processing section 20, an image processing is made to perform to non-ROI, and the result is made to write in memory 30 again at step S131. The example which gives a cross filter as shown, for example in drawing 11 as an image processing to non-ROI is given.

[0091] Performing an image processing to the specified inside or the outside of a field alternatively may be generally carried out by photo retouch software etc., and the processing as these that the image processing to non-ROI which the image-processing section 20 performs is also the same, and a procedure may be used for it. Therefore, if the image data which read the compression data file of a format as shown in the personal computer with which image-processing programs, such as photo retouch software, work at drawing 5 or drawing 8 from the record medium 200 etc., performed the image processing to non-ROI of the image data which elongates compressed data and is obtained, and performed the image processing is compressed and being stored in a record medium 200 etc., the same result as the above can be obtained.

[0092] In addition, as a desirable image processing performed to non-ROI, it is based on the color conversion to a cross filter, a low pass filter, and a sepia tone, and a user assignment color, and smears away, and a poster rise, noise addition, etc. are raised, for example.

[0093] By the above-mentioned configuration, the image processing which gives special effect to ROI can also be performed. as the image processing which gives special effect -- enhancing, a high-pass filter, noise rejection, and color moire ** -- carrying out -- etc. -- it is raised.

[0094] Furthermore, the above-mentioned configuration can also determine the field which performs an image processing, and its contents of processing according to the ROI property 402. For example, although the related example of the image processing and field which are given corresponding to an ROI property is shown below, it is not limited to this.

ROI property: 0 [0095] (Main photographic subject field which the user specified as arbitration)

Processing field 1 (the field processing field of a guidance within the limit photoed in guidance photography mode cross filter ROI Property:Contents [ Of ROI / non-/ processing ]: [ : ] 2 (photographic subject field when a photograph is taken in template image composition mode)): Contents of ROI processing: Color moire ** ROI property: processing field: Contents of non-ROI processing: composition of a template image -- Artie who performed the image processing alternatively out of ROI in this way, and held the image quality of ROI -- a stick photography result can be obtained simple. Moreover, since it can determine automatically what kind of image processing should be performed to which field according to an ROI property, the image which gave the special effect also with an unfamiliar suitable user for an image processing which gives special effect can be obtained easily.

[0096]

[Other operation gestalten] In addition, even if it applies this invention to the system which consists of two or more devices (for example, a host computer, an interface device, a reader, a printer, etc.), it may be applied to the equipments (for example, a copying machine, facsimile apparatus, etc.) which consist of one device.

[0097] Moreover, it cannot be overemphasized by the purpose of this invention supplying the storage (or record medium) which recorded the program code of the software which realizes the function of the operation gestalt mentioned above to a system or equipment, and reading and performing the program code with which the computer (or CPU and MPU) of the system or equipment was stored in the storage that it is attained. In this case, the function of the operation gestalt which the program code itself read from the storage mentioned above will be realized, and the storage which memorized that program code will constitute this invention. Moreover, it cannot be overemphasized that it is contained also when the function of the operation gestalt which performed a part or all of processing that the operating system (OS) which is working on a computer is actual, based on directions of the program code, and the function of the operation gestalt mentioned above by performing the program code which the computer read is not only realized, but was mentioned above by the processing is realized.

[0098] Furthermore, after the program code read from a storage is written in the memory with which the functional expansion unit connected to the functional expansion card inserted in the computer or a computer is equipped, it cannot be overemphasized that it is contained also when the function of the operation gestalt which performed a part or all of processing that CPU with which the functional expansion card and functional expansion unit are equipped based on directions of the program code is actual, and mentioned above by the processing is realized.

[0099] When applying this invention to the above-mentioned storage, the program code corresponding to drawing 2 explained previously thru/or drawing 3, drawing 6 or drawing 7, and/or the flow chart shown in drawing 11 will be stored in the storage.

[0100]

[Effect of the Invention] As explained above, according to this invention, the image processing system which can set an attention field as the image to photo easily, and its approach can be offered.

[0101] Moreover, the image processing system which performs an image processing according to the attention field set as the image, and its approach can be offered.

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[Translation done.]

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]
[Drawing 1] The block diagram showing the example of a configuration of the electronic camera of the 1st operation gestalt,
[Drawing 2] The flow chart which shows an example of the main routine of an electronic camera,
[Drawing 3] The flow chart which shows an example of the main routine of an electronic camera,
[Drawing 4] Drawing showing the example of a display of the guidance frame for portrait photography,
[Drawing 5] Drawing showing the example of a format of compressed data,
[Drawing 6] The flow chart which shows an example of the main routine of the electronic camera of the 2nd operation gestalt,
[Drawing 7] The flow chart which shows an example of the main routine of the electronic camera of the 2nd operation gestalt,
[Drawing 8] Drawing showing the example of a format of compressed data,
[Drawing 9] The flow chart which shows regeneration,
[Drawing 10] The flow chart to which the image processing to non-ROI was added,
[Drawing 11] It is drawing showing the example of an image processing with a cross filter.

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[Translation done.]